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ABSTRACT

The paralinguistic dimension of telephone counseling in such crisis situations as drug and other personal problems was investigated, based on the importance of paralinguistic cues surrounding the linguistic content of the message for the accurate interpretation of the caller's state of mind. Thirty samples, each a three minute sample of crisis communication, were taken from actual telephone conversations and examined to identify the paralinguistic cues that might allow a crisis center volunteer to determine the level of emotional intensity of the caller. Seven dependent variables were assessed: level of pitch, rate of speaking, articulation errors, editorial errors, filled pauses, within-response pauses, and sobbing. Results indicate that only two significantly positive correlations were observed: the frequency of editorial errors with the use of filled pauses, and the increase in pitch level with sobbing. (DF)

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PARALINGUISTIC CUES AT THREE LEVELS OF EMOTIONAL INTENSITY IN ACTUAL CRISIS COMMUNICATION

by

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One common experience shared by all human beings in life is the inevitability of stress. When such a phenomenon occurs, the individual must adapt to its demands and cope with the accompanying emotional states. If the individual cannot utilize familiar coping mechanisms, what may be called "a crisis" occurs with two divergent possible outcomes: (1) the individual increases his personal growth through the exploration of new coping mechanisms, or (2) the individual reverts to further disorientation and maladjustment (Aguilera and Messick, 1974). If the latter possibility occurs, the crisis often includes a sharp rise in tension followed by feelings of inadequacy and confusion resulting from ineffective problem-solving resources (Dixon and Burns, 1974).

The use of the telephone as a medium for crisis communication, specifically crisis intervention, increased dramatically during the decades of the 1950's and 1960's. Crisis communication was, perhaps, most stimulated by the establishment of suicide prevention centers and poison control centers during the 1950's. The popularity of crisis intervention using the telephone as a medium grew rapidly during the 1960's, and eventually all fifty states came to provide telephone crisis intervention services (McCord and Packwood, 1973).

While the majority of crisis telephone calls in most centers in the early 1970's focused on drug abuse, crisis intervention centers actually intervened in a variety of crisis situations. A 1973 survey of 253 community service organizations whose primary function was telephone listening or counseling revealed that many calls were received which relate

to interpersonal relationships, home life, resource information, sexuality, pregnancy, dating, marriage, suicide, and a host of additional life experiences recognized as crises (McCord and Packwood, 1973). The use of the telephone as a medium to provide counseling about such matters was explained by Lester (1974) in his identification of some unique advantages of its use: (1) the telephone is readily available to almost everyone--including those experiencing a crisis, (2) the telephone provides the means of immediate assistance, and (3) the telephone protects client anonymity.

This study was concerned with one dimension of telephone counseling in the crisis situation--paralinguistics. Unlike face to face counseling, telephone counseling must rely on a single channel of communication, the auditory; therefore, paralinguistic cues which surround the linguistic content of the message become especially crucial for the accurate interpretation of the caller's state of mind. Specifically, in the initial phase of this study, samples of crisis communication taken from actual crisis intervention telephone conversations were examined to identify the paralinguistic cues that exist in those messages. Such analysis was performed to isolate the specific variables and combinations of variables that might allow a crisis center volunteer to determine more reliably the level of emotional intensity of the caller.

To establish a foundation for this particular research, the following review of literature will provide background information in two specific areas: (1) crisis intervention in the telephone setting and (2) paralinguistic cues of crisis.

Background

Crisis Intervention in the Telephone Setting

An understanding of crisis intervention theory is essential if one is to provide effective counseling; crisis communication in the telephone setting places unusual constraints upon the counselor. First, due to the accessibility and immediacy of the medium, crisis intervention conducted over the telephone may involve the most intense levels of emotion. Second, while the anonymity of both caller and helper may lead to quicker, more in-depth self-disclosure, anonymity allows minimal commitment from the caller and he or she may terminate the interaction at will. Third, the very nature of this setting allows use of a single channel of communication--the auditory--which represents a significant reduction in the total number of cues from which both caller and helper assess messages (Miller, 1973). The reality of this immediate, intimate yet distant, short-term, single-channel medium lends strength to the need for examination of crisis intervention in the telephone setting.

Literature related to crisis intervention variables and techniques employed in the telephone setting is rather sparse. Most of the literature falls into four basic categories: (1) general survey literature, (2) conceptual literature, (3) performance evaluation literature, and (4) suicide prevention literature. The following summary is a brief examination of the literature in each of these areas.

General Survey Literature. From the late 1950's to the late 1960's the number of crisis intervention telephone services grew from a handful of such services to well over a thousand through the nation (Decell, 1972).

Toward the mid-1970's, however, the number appears to have stabilized at around 1000. A number of surveys were conducted to examine the extent to which telephone counseling exists and to identify the various services available (cf. Haughton, 1968; Potter, 1971; Schwartz, 1971; Musgrave, 1971; McCord and Packwood, 1973; McGee, 1974). In depth descriptions of specific crisis programs included an examination of the Suicide Prevention Center of Los Angeles (cf. Litman et al., 1965; Farberow et al., 1966) and the Suicide Prevention and Crisis Service of Erie County, New York (Lester, 1971). While individual differences were found to exist among the services, the majority of telephone services were found to be open 24 hours, located in urban and suburban areas, and were most often manned by nonprofessional volunteers who had undergone some form of screening or training to qualify for involvement in the program.

Conceptual Literature. Broader-based theoretical and conceptual articles have discussed the strengths and weaknesses of telephone counseling in crisis situations (cf. Lamb, 1970; Motto, 1971; Bleach and Claiborn, 1974). Additional studies have delineated the crucial stages of crisis intervention in the telephone setting (cf. Rapoport, 1961; porter, 1966; Bonstedt, 1970; Schlenker, 1970; Schwartz, 1971; McCarthy and Berman, 1971; Fowler and McGee, 1973; Echterling, 1976).

Performance Evaluation Literature. Performance evaluation literature emphasized the need for assessing the performance of crisis intervention helpers and the need for sufficient training of these individuals (cf. Brockopp and Yasser, 1971; Dixon and Burns, 1974; Carothers and Inslee, 1974). Further, studies were conducted to determine various personality characteristics and psychiatric evaluations of crisis helpers through the following tools:

batteries of personality tests and psychiatric interviews, the MMPI and the Opinion About Mental Illness Scale (Lester and Williams, 1971), the Gordon Personal Profile and the Rokeach Dogmatism Scale (Horn, 1971), the California Psychological Inventory and the Self Assessment of Attitudes Toward Suicide Scale (Smart, 1972), a battery of psychiatric diagnoses (McClure et al., 1973), the FOI and a Self-Disclosure Questionnaire (Tapp and Spanier, 1973), and the Hogan Empathy Scale (Jamison and Johnsen, 1975).

Suicide Prevention Literature. The final area of literature focused specifically on the techniques of suicide prevention in the telephone setting. For example, Litman et al. (1965) outlined three tasks necessary to accomplish to deal effectively with callers in this crisis situation: (1) the helper must establish a relationship with the suicidal caller, (2) the helper must evaluate the suicidal status of the caller, and (3) the helper must formulate treatment--a plan which opens alternatives to the caller. Litman, et al.'s isolation of this specific crisis situation allows a tailoring of crisis techniques to the specific, immediate needs of the suicidal caller.

These four areas represent a growing body of literature concerned with telephone crisis intervention. Most of the literature is, predictably, theoretical, speculative or generally descriptive in nature. The fact that to now relatively little attempt has been made to isolate specific variables operating in telephone crisis communication suggests the opportunity for extensive research in this area.

Paralinguistic Cues of Crisis

In discussing the technical effectiveness of telephone therapists, Fowler and McGee (1973) ennumerated three activities that must take place

during the initial phases of crisis intervention: (1) the helper must guarantee communication so that intervention may take place, (2) the helper must evaluate the caller's condition--that is, assess the intensity of the crisis situation, and (3) the helper must formulate a plan of action to bring about crisis resolution. The second of these activities--evaluating the caller's condition--is particularly dependent upon attention to paralinguistic cues. This study was conducted in part to analyze actual crisis communication and delineate cues crucial to message evaluation in this single-channel medium.

While specific attention to paralinguistic cues in the crisis telephone setting is relatively new in communication research, the identification of emotional meaning through paralinguistic qualities has been a focus of study for many years. Skinner (1935) observed pitch differences between the expression of happiness and sadness and noted that the mean pitch of the voice during expression of happiness is appreciably higher than for sadness or more emotionally neutral states. Other emotions, such as grief, anger, fear, and contempt, resulted in variations in aspects of the voice including pitch as well as rate of speech and ration of pause to phonation (cf. Fairbanks and Pronovost, 1939; Fairbanks and Hoaglin, 1941).

Pfaff (1953) had speakers portray nine different emotions and found that the emotions of joy and hate were most difficult for subjects to identify. Davitz and Davitz (1959a) similarly dealt with 10 emotions and discovered that emotional identification accuracy varied from subject to subject as well as from emotion to emotion. For example, anger was identified correctly most often at 65% of the time while pride and love were identified accurately less than 25% of the time. In a follow-up study, Davitz and Davitz (1959b)

examined how individuals discriminate between two similar emotions expressed vocally. They hypothesized that the accuracy of discrimination between the expression of two feelings is inversely related to the subjective similarity of those feelings; results of the study supported this hypothesis. Furthermore, they discovered that when two emotions are very similar, the emotion most subjectively identified with by the listener is the emotion most easily recognized by the listener.

Knower (1941) discovered emotional meaning can be carried through whispered speech. Later, Pollack et al. (1960) supported this finding and added that emotional meaning can be communicated in a sample of speech as short as six milliseconds.

Other early studies (cf. Dusenberry and Knower, 1939; Knower, 1941) also suggested the importance of the sequence of cues for recognizing emotional meaning. Knower (1941) played recorded emotions backward and noted that the emotions could still be identified beyond chance though the accuracy of the identification was somewhat impaired.

Overall, the recognition of emotional meaning through a variety of vocal cues appears to be well established. Lieberman (1961) and Lieberman and Michaels (1962) experimented with frequency, amplitude, and eight different emotions. Naive listeners were able to identify the correct emotion from untouched voice samples 8% of the time. When all other vocal cues were deleted and only pitch and amplitude were retained in the same voice samples, accuracy of identification dropped to 47%. Further, pitch only information retained in the same samples allowed for correct identification just 44% of the time, indicating that amplitude alone added only 3% to the accuracy in identification. Additional analysis indicated no single

acoustic parameter correlated with various emotions; different speakers favored different acoustic parameters for the transmission of the same emotion, and the perturbations in the fundamental frequency (irregularities in the fine structure of fundamental frequency) carried important information concerning emotion. When the perturbations were smoothed out, considerable confusion in identifying various emotions was observed.

Starkweather (1961) emphasized the significance of paralinguistic analysis when he reported studies of content-free messages clearly indicate that the voice alone carries emotional information, this information appears to be found in such qualities as pitch, rate, and volume, and that judges tend to agree on types of emotion and intensity portrayed through the voice. Kramer (1963) offered further support for both the reliability and validity of vocal judgments within the average range of emotional states. Kramer does admit, however, that a certain amount of mistaken interpretation does exist when making vocal judgments of emotional states and that the majority of studies in this area have not dealt with extreme levels of emotional intensity.

Anxiety Paralinguistic Literature. More specifically, early studies isolated several paralinguistic cues present in the transmission of anxiety (cf. Reusch and Prestwood, 1949; Eldred and Price, 1958) and later studies supported the earlier conclusions (cf. Krause, 1961; Boomer and Goodrich, 1961; Mehrabian, 1969). Through the use of content-free speech, these researchers discovered that anxiety is most often carried through acoustical dimensions of the voice such as fundamental frequency, amplitude, and timing. Sauer and Marcuse (1957) noted that anxiety resulted in a greater number of words used, a quicker response, and a faster rate of speaking by the person.

Boomer and Dittman (1964) discovered that both rate of speaking and filled pauses were affected by the emotional state of the speaker. Their study demonstrates that rate of speaking increases during emotional disturbance and that, as a result of the increased speaking rate, use of filled pauses increases. Further, Kasl and Mahl (1965) utilized a category system of eight speech disturbances ("ah," sentence change, repetition, stutter, omission, sentence incompletion, tongue-slip, and intruding incoherent sound) to study anxiety. They discovered that the frequency of all speech disturbances, with the exception of the use of "ah," increases as a result of increased anxiety. Jurich and Jurich (1974) used a modification of Kasl and Mahl's categories and located a high positive correlation between anxiety and speech errors, editorial errors, and tone. There was only a moderate positive correlation between anxiety and rate of speaking.

Verzeano (1951) discovered that the presence of various emotional factors may create periods of pausing in patterns of normal speech. Several follow-up studies examined the relationship between anxiety and pausal phenomena. Goldman-Eisler's (1955, 1956, 1958) findings indicated that utterances with few syllables per breath and much hesitation indicate anxiety and tension. Geer (1966) maintained that anxiety produced longer and more frequent periods of silence among speakers, and Mathei (1970) investigated the correlation between anxiety and breathing and pausing patterns. Her study revealed that highly anxious speakers utilize more pauses.

Paralinguistic analysis is an established line of research; the present investigation extends such analysis to communication during crisis intervention. To derive a clearer understanding of the use of a caller's vocal

cues in the crisis telephone setting, researchers need to identify and examine those cues.

Hypotheses

The previous review of literature indicates that anxiety and intense emotionality lead to variations in paralinguistic cues. General findings support the view that greater stress and anxiety lead to increases in rate of speaking (cf. Sauer and Marcuse, 1957; Boomer and Dittman, 1964), a variety of speech disturbances (cf. Lerea, 1956; Kasl and Mahl, 1965; Jurich and Jurich, 1974), filled pauses (cf. Verzeano, 1951; Goldman-Eisler, 1955, 1956, 1958; Geer, 1966). As a result, the following hypotheses are posited for study:

H_1 pitch level will increase with increasing levels of crisis intensity

H_2 speaking rate will increase with increasing levels of crisis intensity

H_3 frequency of articulation errors will increase with increasing levels of crisis intensity

H_4 frequency of editorial errors will increase with increasing levels of crisis intensity

H_5 frequency of filled pauses will increase with increasing levels of crisis intensity

H_6 frequency of within-response pauses will increase with increasing levels of crisis intensity

H_7 frequency of sobbing will increase with increasing levels of crisis intensity

Definitions. Actual crisis communication consists of the initial three-minute segments of tape-recorded telephone calls placed to a crisis intervention service.* This sample of calls was classified a priori by three crisis center volunteers according to three levels of emotional intensity reflected in a transcript of the call: (1) general information/referral, (2) continuing life situation, and (3) immediate problem situation. Such classification is both common and necessary in the coding of incoming calls at crisis centers and is outlined in the Lafayette Crisis Center Training Manual (1975).

The dependent variables employed in the testing of the previous hypotheses included seven paralinguistic cues examined in actual crisis communication at three levels of emotional intensity. The paralinguistic cues were the following: (1) pitch, a fundamental frequency measure recorded in hertz per second; (2) rate of speaking, measured in syllables per second; (3) articulation errors such as stutters, tongue slips, and incoherent sounds measured by a frequency count (Jurich and Jurich, 1974); (4) editorial errors such as omissions, sentence changes, and sentence incompletions measured by a frequency count (Jurich and Jurich, 1974); (5) filled pauses such as "ah" and its less frequent variations, repetitions, and phrases such as "you know" measured by a frequency count (Jurich and Jurich, 1974); (6) within-response pauses over three seconds in duration beginning after the first word spoken by the caller until the caller speaks again, uninterrupted by the volunteer (research by Knapp, Hart, and Dennis, 1974, indicates this measure is reflective of the speaker's use of commas, semicolons, and periods);

*No actual crisis communication data in this study were collected from the Lafayette Crisis Center. Caller confidentiality and anonymity are of utmost concern at the Center; crisis interaction is never tape-recorded.

(7) sobbing defined as quick intakes of breath in the context of crying measured by a frequency count. Each of these paralinguistic cues was measured and analyzed by appropriate methods.

Methodology

The Research Design. To test the hypotheses a 1 x 3 factorial design was employed. Actual crisis communication was compared across three levels of crisis intensity (general information/referral, continuing life situation, and immediate problem situation). Seven dependent variables were assessed: (1) level of pitch, (2) rate of speaking, (3) articulation errors, (4) editorial errors, (5) filled pauses, (6) within-response pauses, and (7) sobbing.

Subjects. Actual crisis communication consisted of 30 initial three-minute segments of tape-recorded telephone conversations. The conversations were recorded by use of wire-tap devices placed on the telephone lines at a crisis intervention service; helpers knew of the wire-tap procedure, but callers did not. The sample of calls used in this study included those from 15 male and 15 female callers varying in age and type of crisis, but equally distributed a priori among the three levels of intensity. While sex was not an independent variable of this study, the variable was held constant to control pitch differences due to sex.

The sample of actual crisis communication was provided by Dr. Richard McGee, former Director of the Center for Crisis Intervention Research in Gainesville, Florida. This organization, established for crisis intervention research, tape-recorded crisis call conversations between December, 1969, and December, 1973. Dr. McGee granted permission for use, under his direction, a sample of these recordings which consists of several thousand incoming

crisis calls recorded and systematically stored. Only edited tapes, with identification of names and places deleted, were used. The original tapes were collected under a National Institute of Mental Health grant (#MH16861) awarded to Dr. McGee.

Data Collection Measurements and Procedures. Seven dependent variables were measured: level of pitch, rate of speaking, articulation errors, editorial errors, filled pauses, within-response pauses, and sobbing.

To measure pitch, a 40 second sample of uninterrupted speech from each subject was edited onto a master tape. While the original sample was recorded at 7½ inches per second, the sample was played at half speech and digitalized by the hybrid computer in the Department of Electrical Engineering at Purdue University; the digitalized data were then stored on magnetic tape.

Pitch, as measured in hertz per second, was determined by use of a computer program developed by Dr. Yoshiyuki Horii of the Department of Audiology and Speech Sciences at Purdue University. In addition to several dimensions of acoustic analysis, this program provides a mean fundamental frequency for each sample analyzed; such mean values were the data used in the statistical analyses performed to test the hypotheses concerning pitch differences.

The measure of rate of speaking was derived from the voice samples extracted for pitch analysis. The verbal content of each 40 second sample of uninterrupted speech was transcribed. From the transcriptions of verbal content, a count of syllables was made and a ratio of syllables per second was determined for each subject. These ratios were the basis for statistical group comparisons.

The remaining dependent variables (articulation errors, editorial errors, filled pauses, within-response pauses, and sobbing) were measured by three trained coders counting the presence of each. Each coder listened to the initial three-minute segments of crisis interaction and recorded the frequency of occurrence for each variable. Inter-coder reliability was determined by calculating a Pearson product-moment correlation coefficient (Huck, Cormier, and Bounds, 1974). The following correlation coefficients reflect the reliability estimates for the coding of each variable: articulation errors (.87), editorial errors (.92), filled pauses (.94), within-response pauses (.98), and sobbing (.98).

Analysis of the Data. Actual crisis communication data were analyzed by a one-way analysis of variance on three levels procedure. Each dependent variable (level of pitch, rate of speaking, articulation errors, editorial errors, filled pauses, within-response pauses, and sobbing) was compared across the three levels of intensity--general information/referral, continuing life situation, and immediate crisis situation. An F value was calculated and probabilities at .05 or below were reported as statistically significant. Where significance did occur, the Newman-Keuls multiple comparison test was conducted for post hoc analysis.

Results

(1) Pitch Level. The mean scores for this variable are:

Table 1
Mean Scores for Pitch Level

Level 1	Level 2	Level 3	Total
164.400 n=10 SD=34.1702	170.900 n=10 SD=65.8052	179.000 n=10 SD=58.0536	171.433 n=30

The analysis of variance table for this variable is:

Table 1.1
One-Way Analysis of Variance for Pitch Level

Source	df	SS	MS	F
Between Groups	2	1070.0667	535.0333	.181
Within Groups	27	79813.3000	2956.0481	
Total	29	80883.3667		

N.S.

A comparison of group means indicated no statistically significant difference across levels of intensity.

(2) Speaking Rate. The mean scores for this variable are:

Table 2
Mean Scores for Speaking Rate

Level 1	Level 2	Level 3	Total
3.8075 n=10 SD=.7747	3.3200 n=10 SD=.8837	2.8350 n=10 SD=.9133	3.321 n=30

The analysis of variance table for this variable is:

Table 2.1
One-Way Analysis of Variance for Speaking Rate

Source	df	SS	MS	F
Between Groups	2	4.7288	2.3644	3.202*
Within Groups	27	19.9376	.7384	
Total	29	24.6664		

*p < .05

A comparison of group means indicated a statistically significant difference across levels of intensity.

Table 2.2
Newman-Keuls Sequential Range Test
Table of Differences Between Means for Speaking Rate

Rank	Level 3	Level 2
Level 1	.973*	.488
Level 2	.485	

*$p < .05$

Results indicate that the significant difference is located between Level 1 and Level 3.

(3) Articulation Errors. The mean scores for this variable are:

Table 3
Mean Scores for Articulation Errors

Level 1	Level 2	Level 3	Total
1.000 n=10 SD=.9428	1.150 n=10 SD=1.1068	.550 n=10 SD=.7619	.900 n=30

The analysis of variance table for this variable is:

Table 3.1
One-Way Analysis of Variance for Articulation Errors

Source	df	SS	MS	F
Between Groups	2	1.9500	.9750	1.086
Within Groups	27	24.2500	.8981	
Total	29	26.2000		

N.S.

A comparison of group means indicated no statistically significant differences across levels of intensity.

(4) Editorial Errors. The mean scores on this variable are:

Table 4
Mean Scores for Editorial Errors

Level 1	Level 2	Level 3	Total
3.100 n=10 SD=2.5254	3.050 n=10 SD=2.1009	1.600 n=10 SD=1.5055	2.583 n=30

The analysis of variance for this variable is:

Table 4.1
One-Way Analysis of Variance for Editorial Errors

Source	df	SS	MS	F
Between Groups	2	14.5167	7.2583	1.668
Within Groups	27	117.5250	4.3528	
Total	29	132.0417		

N.S.

A comparison of group means indicated no statistically significant differences across levels of intensity.

(5) Filled Pauses. The mean scores for this variable are:

Table 5
Mean Scores for Filled Pauses

Level 1	Level 2	Level 3	Total
15.950 n=10 SD=4.6693	22.000 n=10 SD=10.1215	7.950 n=10 SD=5.8805	15.300 n=30

The analysis of variance table for this variable is:

Table 5.1
One-Way Analysis of Variance for Filled Pauses

Source	df	SS	MS	F
Between Groups	2	993.3500	496.6750	9.381**
Within Groups	27	1429.4500	52.9426	
Total	29	2422.8000		

**p < .01

A comparison of group means indicated a statistically significant difference across levels of intensity.

Table 5.2
Newman-Keuls Sequential Range Test
Table of Differences Between Means for Filled Pauses

Rank	Level 3	Level 1
Level 2	14.050**	6.050
Level 1	8.000*	

*p < .05
**p < .01

Results indicate that the significant differences are located between Level 2 and Level 3 as well as Level 1 and Level 3.

(6) Within-Response Pauses. The mean scores for this variable are:

Table 6
Mean Scores for Within-Response Pauses

Level 1	Level 2	Level 3	Total
.200 n=10 SD=.4216	.200 n=10 SD=.6325	.200 n=10 SD=.4216	.200 n=30

Appropriate analysis could not be completed due to insufficient data in each cell.

(7) Sobbing. The mean scores for this variable are:

Table 7
Mean Scores for Sobbing

Level 1	Level 2	Level 3	Total
0 n=10 SD=.0000	2.100 n=10 SD=4.9092	10.550 n=10 SD=13.3530	6.325 n=30

Appropriate analysis could not be completed due to insufficient data in one cell.

Discussion

The results of this study are discussed in terms of the seven dependent variables utilized.

Pitch Level. Pitch level data indicated no significant differences across intensity levels. Previous research indicated pitch differences in the expression of various emotions--usually a higher pitch level for extreme emotions and a lower pitch level for more neutral emotions.

In a general sense, the findings of this study are in accord with previous findings. The three levels of emotional intensity in this study were not operationalized to reflect specific emotions. A variety of emotions may have been reflected at each level of intensity, thus accounting for no significant differences across intensity levels.

Speaking Rate. Previous research reported that increased anxiety results in a faster speaking rate (cf. Sauer and Marcuse, 1957; Boomer and Dittman, 1964). The findings of this study, however, do not support this conclusion. Level 1 callers demonstrated a significantly faster speaking rate than callers in Level 2 or Level 3. An explanation for this finding may lie in the nature of the call most often found in Level 1--a general information or referral call in which the speaker is asking or giving information. The certainty of such information sharing in the Level 1 call could result in the increased verbal content (syllables per second) not found in the other two levels.

Articulation Errors. While previous research discovered that increased anxiety results in increased articulation errors (cf. Kasl and Mahl, 1965; Jurich and Jurich, 1974), analysis of articulation errors in actual crisis communication across three levels of crisis intensity produced no significant differences. These findings lend support to an observation previously made: a variety of emotions actually may be represented at each level of intensity, thus eliminating any significant differences across the three levels.

Editorial Errors. Analysis of the frequency of editorial errors in actual crisis communication across the three intensity levels demonstrated no

significant differences. A closer examination of the mean scores indicates, however, that Level 3 calls reflect the least frequent use of editorial errors of any intensity level. While previous research findings indicated that increased anxiety results in increased editorial errors (cf. Kasl and Mahl, 1965; Jurich and Jurich, 1974), this study does not support those findings; further, no explanation is evident for the discreptancy with previous findings.

Filled Pauses. Although Kasl and Mahl (1965) did not discover any differences in the frequency of occurrence of filled pauses with increased anxiety, in this study significantly fewer filled pauses occurred in Level 3 than any other intensity levels. While stereotypical portrayals of emotional intensity often use filled pauses as an indication of stress and anxiety, actual crisis samples support Kasl and Mahl's findings--the use of filled pauses does not increase with increased emotional intensity.

Within-Response Pauses. Since no significant differences emerged across intensity levels, analysis of the frequency of within-response pauses did not support the findings reported in previous literature (cf. Goldman-Eisler, 1955, 1956, 1958; Geer, 1966; Mathei, 1970). It should be noted, however, that there were not enough data to fill all cells of the research design and, therefore, permit analysis.

On within-response pauses the data collected (defined as a three-second or longer pause within the response of the caller) indicated that such pauses are infrequent. The infrequency of within-response pauses suggests that the helper may not be tolerant of silence and allow such pauses to occur. In actual crisis communication the helper often interrupted silence; such

silences would have been interpreted as a within-response pause if the caller had been allowed to continue his or her message after the pause.

Sobbing. Insufficient data did not allow statistical analysis of this dependent variable. It should be noted, however, that while sobbing does not appear frequently, its presence in the context of the crisis situation carries significant impact. Unlike several other paralinguistic cues which gain importance as a function of duration, sobbing's presence (even once during an interaction) indicates emotion that cannot be ignored simply because of the infrequency of occurrence.

Examination of the seven dependent variables independently is warranted, but raises a question of their interdependence. A matrix of Pearson correlation coefficients (Table 8) illustrates the interdependence of the seven variables

From the correlational analysis, only two significantly positive correlations can be observed. The frequency of editorial errors correlates positively with the use of filled pauses in crisis communication. Such a correlation is not surprising for as editorial errors (such as sentence changes or sentence incompletions) occur, it is also likely that the use of "ah," repetitions, and filler phrases will occur to fill the pauses editorial errors create. The second positive correlation relates pitch level increase and sobbing. Since previous analysis does not indicate that pitch level increases significantly as a result of increased anxiety, an alternative explanation may better serve to justify this phenomenon. Because sex differences were not a concern of this study, the dependent variables were gathered from both male and female callers. Sobbing behavior,

Table 8

Pearson Correlation Coefficients

Variable	Speaking Rate	Within Pauses	Artic. Errors	Editorial Errors	Filled Pauses	Sobbing	Pitch Level
Speaking Rate	1.0000 S=.001	-.4012 S=.001***	-.0148 S=.455	-.1069 S=.208	.0842 S=.261	-.3290 S=.005**	-.0168 S=.449
Within-Response Pauses	-.4012 S=.001**	1.0000 S=.001	-.1074 S=.207	.2006 S=.062	.0559 S=.336	.0845 S=.260	-.1101 S=.201
Articulation Errors	-.0148 S=.455	-.1074 S=.207	1.0000 S=.001	.1796 S=.085	.1819 S=.082	-.1735 S=.092	-.3306 S=.005**
Editorial Errors	-.1069 S=.208	.2006 S=.062	.1796 S=.085	1.0000 S=.001	.2950 S=.011*	-.0053 S=.484	-.0711 S=.295
Filled Pauses	.0842 S=.261	.0559 S=.336	.1819 S=.082	.2950 S=.011*	1.0000 S=.001	-.1853 S=.078	-.3222 S=.006**
Sobbing	-.3290 S=.005**	.0845 S=.260	-.1735 S=.092	-.0053 S=.484	-.1853 S=.078	1.0000 S=.001	.3486 S=.003**
Pitch Level	-.0168 S=.449	-.1101 S=.201	-.3306 S=.005**	-.0711 S=.295	-.3222 S=.006**	.3486 S=.003**	1.0000 S=.001

*p < .05
**p < .01
***p < .001

however, was demonstrated by female callers only; thus, sobbing correlated strongly with the increased pitch level physiologically produced by the female voice.

The other significant correlations are negative and are rather easily understood. For example, as speaking rate increases, the use of filled pauses decreases; as speaking rate increases, the frequency of sobbing decreases. Relationships such as these reflect the fact that the phenomena under investigation do not or cannot occur simultaneously.

Correlational analysis suggests that the seven dependent variables of this study warrant separate analysis and each is a legitimate concern in paralinguistic research.

This study examined seven paralinguistic cues across three levels of emotional intensity in actual crisis communication. While previous research has explored the crisis setting from a variety of perspectives or has related paralinguistic cues to a number of characteristics, this study serves as a foundation in the exploration of the paralinguistic dimensions of crisis communication. The data reported in this study appear to warran further exploration of the paralinguistic cues of telephone crisis intervention.

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